

Technical Rules: Assessment Report

Clean Water Act, 2006

December 12, 2008

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Part I - General

Part I.1 - Definitions

1. In these rules,

(1) the following definitions apply:

“Act” means the *Clean Water Act, 2006*;

“allocated quantity of water” means,

(a) in respect of a surface water intake or well relating to a planned system, the annual mean quantity of water that is anticipated to be taken by the intake or well; and

(b) in respect of an existing surface water intake or well, the lesser of A and B:

A. The maximum annual quantity of water that can lawfully be taken by the intake or well.

B. The sum of the mean annual quantity of water taken by the intake or well and any additional quantity of water that would have to be taken annually by the intake or well to meet the committed demand of the system.

“census consolidated subdivisions” means the census consolidated subdivisions set out on the reference maps prepared for the Agricultural Division of Statistics Canada and titled “Map 2A – Ontario, 2006 Census Divisions and Census Consolidated Subdivisions”, “Map 2B – Ontario, 2006 Census Divisions and Census Consolidated Subdivisions”, and “Map 2C – Ontario, 2006 Census Divisions and Census Consolidated Subdivisions”.

“committed demand” means the increase in the quantity of water provided by a drinking water system that would be required if the area served by the system were developed in accordance with the official plans for the area to an extent that would result in the greatest use of drinking water.

“cone of influence” means:

- (a) in respect of one or more wells that draw water from a unconfined aquifer, the area within the depression created in the water table when the wells are pumped at a rate equivalent to their allocated quantity of water; and
- (b) in respect of one or more wells that draw water from a confined or semi-confined aquifer, the area within the depression created in the potentiometric surface when the wells are pumped at a rate equivalent to their allocated quantity of water;

“connecting channel” means the St. Lawrence River, St. Mary’s River, St. Clair River, Detroit River, Niagara River and the Welland Canal;

“consumptive activity” means an activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body;

“Director” means a director appointed for the purpose of section 107 of the Act;

“drinking water” has the same meaning as in the *Safe Drinking Water Act, 2002*;

“extreme event” means

- (a) a period of heavy precipitation or winds up to a 100 year storm event;
- (b) a freshet; or
- (c) a surface water body exceeding its high water mark;

“future development” means the development of an area in accordance with the official plans applicable to the area to an extent that would have the most significant impact on the quality of water used for drinking water purposes and the quantity of water available from sources of drinking water;

“geographic information system” means a computer based system that has the capability to input, store, retrieve, manipulate, analyze, and output geographically referenced data;

“Great Lakes agreement” means an agreement to which subsection 14(1) of the Act applies;

“land cover” means the physical and biological cover on the land, including vegetation and anthropogenic features;

“livestock density” means the number of farm animals grown, produced or raised per square kilometre of an area, separated by type of farm animals specified in section 3.1 of the Nutrient Management Protocol;

“local area” means,

(a) in respect of a surface water intake, the drainage area that contributes surface water to the intake and the area that provides recharge to an aquifer that contributes groundwater discharge to the drainage area; and

(b) in respect of a well, the area that is created by combining the following areas:

(i) the cone of influence of the well;

(ii) the cones of influence resulting from other water takings where those cones of influence intersect that of the well; and

(iii) the areas where a reduction in recharge would have a measurable impact on the cone of influence of the well;

“managed land” means land to which materials are applied as nutrients;

“Nutrient Management Protocol” has the same meaning as in O. Reg. 267/03 (General), made under the *Nutrient Management Act, 2002*;

“official plan” means an official plan prepared in accordance with part III of the *Planning Act*;

“Ontario Drinking Water Quality Standards” means Ontario Regulation 169/03 (Ontario Drinking Water Quality Standards) made under the *Safe Drinking Water Act, 2002*;

“Regulation Limit” means the area delineated on a map or series of maps filed at the head office of a conservation authority in accordance with a regulation made under subclause 28(1)(c) of the *Conservation Authorities Act* and subsection 4(4) of O. Reg. 97/04 (Content of Conservation Authority

Regulations Under Subsection 28(1) of the Act: Development, Interference with Wetlands and Alterations to Shorelines and Watercourses) made under that Act;

"river" includes a creek, stream, brook and any similar watercourse but does not include a connecting channel;

"Soil, Ground Water and Sediment Standards" means the Ministry of the Environment publication entitled "Soil, Ground Water and Sediment Standards for Use under Part XV.1 of the *Environmental Protection Act*" dated March 9, 2004;

"study year" means the calendar year immediately before the year in which the most recent terms of reference related to the source protection area was required to be submitted to the Minister in accordance with section 10 of the Act;

"subwatershed" means an area that is drained by a tributary or some defined portion of a stream;

"surface soil" means soil that is no more than 1.5 metres beneath the soil surface but does not include soil beneath any non-soil surface treatment including asphalt, concrete or aggregate;

"Tables of Drinking Water Threats" means the Ministry of the Environment publication of that name dated December 12, 2008;

"Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines" means the Ministry of the Environment publication of that name dated June 2003 as amended June 2006;

"ten year drought period" means the continuous ten year period for which precipitation records exist with the lowest mean annual precipitation;

"Tier One" in respect of a water budget means a water budget developed using a geographical information system or equivalent to assess groundwater flows and levels, surface water flows and levels, and the interactions between them;

"Tier Two" in respect of a water budget means a water budget developed using computer based three dimensional groundwater flow models and computer based continuous surface water flow models to assess groundwater flows and levels, surface water flows and levels, and the interactions between them;

“Tier Three” in respect of a water budget means a water budget developed using computer based three dimensional groundwater flow models and computer based continuous surface water flow models to assess groundwater flows and levels, surface water flows and levels, and the interactions between them, and that includes consideration of the following circumstances:

- (a) current and future land cover within the area;
- (b) hydraulic flow controls within the area;
- (c) water taken by the surface water intakes and wells related to the area;
- (d) other uses of water within and downstream of the area;
- (e) steady and transient states in groundwater;
- (f) drought conditions;
- (g) the average daily supply and demand for surface water within the area;
and
- (h) average monthly supply and average monthly demand for groundwater within the area;

“time of travel” means,

- (a) in respect of groundwater, the length of time that is required for groundwater to travel a specified horizontal distance in the saturated zone;
and
- (b) in respect of surface water, the length of time that is required for surface water to travel a specified distance within a surface water body;

“total impervious surface area” means the surface area of all highways and other impervious land surfaces used for vehicular traffic and parking, and all pedestrian paths;

“two year drought period” means:

- (a) in relation to an assessment of surface water quantity, the continuous two year period for which precipitation records exist with the lowest mean annual precipitation, and

(b) in relation to an assessment of groundwater quantity, a simulated two year period with no groundwater recharge;

“type I system” means a drinking water system described in subclause 15(2)(e)(i) of the Act;

“type II system” means a drinking water system described in subclause 15(2)(e)(ii) of the Act;

“type III system” means a drinking water system described in subclause 15(2)(e)(iii) of the Act; and

“water taking” has the same meaning as in the *Ontario Water Resources Act*;

(2) the following equation shall be used where these rules require the calculation of a percent water demand in relation to groundwater:

$$\begin{array}{l} \text{\% Water Demand} \\ \text{(Groundwater)} \end{array} = \frac{\text{DEMAND}}{\text{SUPPLY- RESERVE}} \times 100;$$

(3) the following equation shall be used where these rules require the calculation of a percent water demand in relation to surface water:

$$\begin{array}{l} \text{\% Water Demand} \\ \text{(Surface water)} \end{array} = \frac{\text{DEMAND}}{\text{SUPPLY- RESERVE}} \times 100.$$

Part I.2 - Assessment Report Contents

Watershed Characterization

2. The watershed shall be described for the purposes of paragraph 1 of subsection 13(1) of O. Reg.287/07 (General) in accordance with Part II.

Water budget

3. Subject to rule 4, a water budget set out for the purpose of clause 15(2)(c) of the Act shall be completed as follows:

(1) prepare a conceptual water budget for every watershed in accordance with Part III.1; and

(2) prepare a water budget for every subwatershed in the source protection area in accordance with Part III.2.

4. An area represented by a conceptual water budget or water budget prepared in accordance with rule 3 shall not include any part of a surface water body that is a Great Lake, a connecting channel, Lake Simcoe, Lake Nipissing, Lake St. Clair or the Ottawa River.

Vulnerable area delineation

5. The identification of vulnerable areas for the purposes of clauses 15(2)(d) and 15(2)(e) of the Act shall be completed as follows:

- (1) prepare a qualitative description of the geophysical and hydrodynamic settings across the source protection area, including the probable location of significant groundwater recharge areas, highly vulnerable aquifers and wellhead protection areas;
- (2) assess and delineate areas of groundwater vulnerability in accordance with Part IV;
- (3) delineate highly vulnerable aquifers, significant groundwater recharge areas and wellhead protection areas in accordance with Part V; and
- (4) delineate surface water intake protection zones in accordance with Part VI.

Drinking water issues

6. The description of drinking water issues for the purpose of clause 15(2)(f) of the Act shall be completed in accordance with Part XI.1.

Drinking water threats

7. The listing of drinking water threats for each vulnerable area for the purpose of clause 15(2)(g) of the Act shall be completed as follows:

- (1) for every local area for which Part III.2 requires a water budget to be prepared, assign a risk level associated to the area in accordance with Part IX;
- (2) list those activities that are determined to be activities that are or would be drinking water threats in relation to water quantity in accordance with Part X.1;
- (3) list those activities that are determined to be activities that are or would be drinking water threats in relation to water quality in accordance with Part XI.2; and
- (4) list those conditions that result from past activities that are determined to be drinking water threats in relation to water quality in accordance with Part XI.3.

Significant, moderate or low drinking water threats

8. The identification of the areas within vulnerable areas where an activity is or would be a significant, moderate or low drinking water threat for the purpose of subclause 15(2)(h)(i) of the Act and subparagraphs 2i and 2ii of subsection 13(1) of O. Reg. 287/07 (General) and where a condition that results from past activities is a significant, moderate or low drinking water threat for the purpose of subclause 15(2)(h)(ii) and subparagraphs 2iii and 2iv of subsection 13(1) of O. Reg. 287/07 (General) shall be completed as follows:

- (1) assign vulnerability scores to highly vulnerable aquifers, significant groundwater recharge areas and wellhead protection areas in accordance with Part VII;
- (2) assign vulnerability scores to surface water intake protection zones in accordance with Part VIII;
- (3) identify those areas where activities listed as drinking water threats in relation to water quantity in accordance with Part X.1 that are or would be significant or moderate drinking water threats in accordance with Part X.2;
- (4) identify those areas where activities listed as drinking water threats in relation to water quality in accordance with Part XI.2 are or would be significant, moderate or low drinking water threats in accordance with Part XI.4; and
- (5) identify those areas where conditions that result from past activities and that are listed as drinking water threats in accordance with Part IX.3 are significant, moderate or low drinking water threats in accordance with Part XI.5.

Minimum information

9. An assessment report shall include the following:

- (1) One or more maps, graphics or tables detailing,
 - (a) the elements required to be included in a characterization of a watershed in accordance with Part II;
 - (b) the component elements of the water budget for the source protection area that are listed in rule 19;
 - (c) the location or distribution of the following within the source protection area:
 - (i) areas of groundwater vulnerability determined in accordance with Part IV.1;

- (ii) vulnerable areas delineated in accordance with Parts V and VI;
 - (iii) drinking water systems and their related surface water intake protection zones and wellhead protection areas;
 - (iv) vulnerability scores within areas within vulnerable areas assigned in accordance with Part VII and VIII;
 - (v) stress levels assigned to subwatersheds in accordance with Part III.3 and Part III.4;
 - (vi) risk levels assigned to local areas in accordance with Part IX.1;
 - (vii) vulnerability scores for areas within vulnerable areas;
 - (viii) source vulnerability factors and area vulnerability factors for areas within surface water intake protection zones;
 - (ix) areas determined in accordance with Parts X and XI.4 to be areas within vulnerable areas where activities listed as drinking water threats in accordance with Parts X and XI.2 are or would be a significant, moderate or low drinking water threats;
 - (x) areas determined in accordance with Part XI.5 to be areas within vulnerable areas where conditions resulting from past activities listed as drinking water threats in accordance with Part XI.3 are significant, moderate or low drinking water threats;
 - (xi) areas within a vulnerable area where drinking water threats listed in accordance with rule 118 or 119 may contribute to a parameter or pathogen associated with a drinking water issue described in accordance with rule 114;
 - (xii) drinking water issues and the related information described in rules 114 and 115;
- (d) activities that are or would be and conditions resulting from past activities that are drinking water threats and their respective hazard rating if one is required to be determined in accordance with rule 120, 121 or 139;
- (e) the number of locations at which an activity that is a significant drinking water threat is being engaged in; and
- (f) the number of locations at which a condition resulting from a past activity is a significant drinking water threat.

(2) A written description of the work undertaken in accordance with these rules including,

- (a) information sources for data used in developing the assessment report and the purposes for which information was used;
- (b) methods of analysis applied to the data;
- (c) any limitations in respect of (a) and (b);
- (d) the component elements of the water budget for the source protection area that are listed in Part III.1 and the interrelationships between those elements;
- (e) with respect to the assessment of the climate of the source protection area undertaken in accordance with Part III.1, the effects that projected changes in the climate over the following 25 years will have on the conclusions reached in the assessment report and a list of the information sources underlying those projected changes;
- (f) a description of every uncertainty analysis conducted in accordance with these rules and the results of that analysis; and
- (g) a description of how the Great Lakes agreements were considered in the work undertaken, if the source protection area contains water that flows into the Great Lakes or the St. Lawrence River.

(3) Tables listing with respect to the source protection area:

- (a) the quality of groundwater and surface water across the area;
- (b) the results of every calculation, assessment and assignment required by Parts III.3, III.4 and IX;
- (c) conditions resulting from past activities that are drinking water threats; and
- (d) stress levels assigned to subwatersheds and risk levels assigned to local areas.

Part I.3 - General

Method and models

10. A method or model used in the preparation of the assessment report shall be representative of the area or thing under study.

No assessment of risk management measures

11. Where these rules provide for or require an assessment of risk for the purpose of listing a drinking water threat in accordance with clause 15(2)(g) of the Act or for the purpose of identifying an area where a drinking water threat may be a significant, moderate or low drinking water threat in accordance with 15(2)(h) of the Act and subsection 13(1) of O. Reg. 287/07 (General), the assessment does not and shall not include consideration of any risk management measures.

Map standards

12. Maps submitted in an assessment report shall,
- (1) include a title, scale bar and a compass rose indicating north;
 - (2) include a legend using symbols in accordance with the document titled “Mapping Symbolology for the *Clean Water Act*, Version 3.0”, dated November 2008 and published by the Ministry of Natural Resources; and
 - (3) be uncluttered and have such large and clear typeface and symbols that they remain legible upon being reduced to one half of their original size.

Part I.4 - Uncertainty analysis – Water quality

13. An analysis of the uncertainty, characterized by “high” or “low” shall be made in respect of the following:

- (1) the assessment of the vulnerability of groundwater throughout the area undertaken in accordance with Part IV;
- (2) the delineation of highly vulnerable aquifers, significant groundwater recharge areas and wellhead protection areas undertaken in accordance with Part V;
- (3) the delineation of surface water intake protection zones undertaken in accordance with Part VI;
- (4) the assessment of the vulnerability of surface water intake protection zones undertaken in accordance with Part VIII; and
- (5) the assessment of the vulnerability of significant groundwater recharge areas, highly vulnerable aquifers and wellhead protection areas undertaken in accordance with Part VII;

14. The following factors shall be considered in an analysis conducted for the purpose of rule 13:

- (1) the distribution, variability, quality and relevance of data used in the preparation of the assessment report;
 - (2) the ability of the methods and models used to accurately reflect the flow processes in the hydrological system;
 - (3) the quality assurance and quality control procedures applied;
 - (4) the extent and level of calibration and validation achieved for models used or calculations or general assessments completed;
 - (5) for the purpose of subrule 13(1), the accuracy to which the groundwater vulnerability categories effectively assess the relative vulnerability of the underlying hydrogeological features; and
 - (6) for the purpose of subrule 13(4), the accuracy to which the area vulnerability factor and the source vulnerability factor effectively assesses the relative vulnerability of the hydrological features.
15. An uncertainty factor of “high” or “low” shall be assigned to each vulnerable area delineated based on the results of the analysis conducted under rule 13.

Part II – Watershed Characterization

16. The following elements shall be included in a characterization of a watershed:

- (1) The boundaries of the watershed.
- (2) The following areas within the watershed:
 - (a) subwatersheds;
 - (b) areas of settlement, as defined in the *Places to Grow Act, 2005*;
 - (c) municipal boundaries, and their population and population density;
 - (d) reserves as defined in the *Indian Act* (Canada), and their population and population density; and
 - (e) federal lands.
- (3) With respect to drinking water systems,
 - (a) the location and area served by a system;
 - (b) the classification of the system into the following classifications as defined by O. Reg. 170/03 (Drinking Water Systems) made under the *Safe Drinking Water Act, 2002*:
 - (i) large municipal residential system;
 - (ii) small municipal residential system;
 - (iii) large municipal non-residential system;
 - (iv) small municipal non-residential system;
 - (v) non-municipal year-round residential system;
 - (vi) non-municipal seasonal residential system;
 - (vii) large non-municipal non-residential system; and
 - (viii) small non-municipal non-residential system;
 - (c) the number of users served by the system;
 - (d) the location of surface water intakes and wells that are part of the system, and their average annual and average monthly pumping rates; and

- (e) the location of monitoring wells related to the system.
 - (4) The location and types of natural vegetative cover, including wetlands, woodlands and vegetated riparian areas, and the percentage of land coverage of each type.
 - (5) The location and types of aquatic habitats, including coldwater, mixed, and warm water fisheries, and macroinvertebrate communities.
 - (6) A comparison of the communities described in clause (5) to similar communities not impacted by anthropogenic factors.
 - (7) Species within the source protection area that are on the Species at Risk in Ontario List as defined in the *Endangered Species Act, 2007* and the locations of their habitats.
 - (8) Surface water quality and groundwater quality across watersheds.
 - (9) The location of managed lands and the percentage of managed lands within census consolidated divisions.
 - (10) Locations where the growing, raising or production of livestock is undertaken and the livestock density within census consolidated subdivisions.
 - (11) The percentage of total impervious surface areas within each square kilometre of vulnerable areas.
17. For the purposes of subrule 16(11), the location of a square kilometre in a vulnerable area shall be determined by overlaying a 1 kilometre by 1 kilometre grid over the vulnerable area with a node of the grid centred on the centroid of the vulnerable area.
18. Parameters used to assess the quality of groundwater and surface water across the watershed shall be selected with consideration given to the natural features and land uses within the source protection area.

Part III – Water Budget

Part III.1 - Conceptual Water Budget

19. A conceptual water budget shall include an assessment of the following elements,

- (1) Physiography.
- (2) Geology.
- (3) Surface water bodies and their flows and levels.
- (4) Surface water control structures.
- (5) Groundwater systems and their flows and levels.
- (6) Wells and surface water intakes.
- (7) Interactions between groundwater and surface water.
- (8) The maximum annual quantity of water that can lawfully be taken by each surface water intake and well.
- (9) How land cover across the area affects groundwater and surface water.
- (10) Existing and projected uses of water, including drinking water, waste water treatment, agriculture, livestock, domestic use, industrial use and commercial use.
- (11) Aquatic habitat dependant upon water depth, flow and temperature.
- (12) Trends related to any items listed in subrules (1) to (11).
- (13) The climate of the area, including historical trends and existing projections related to changes in the climate of the area.

Part III.2 – Subwatershed water budgets

20. Subject to rule 24, prepare a Tier One water budget for every subwatershed in the source protection area.

21. Subject to rule 24, using the data underlying the Tier One water budget for the subwatershed, assign every subwatershed in the source protection area a surface water stress level and a groundwater stress level in accordance with Part III.3.

22. Subject to rule 24, prepare a Tier Two water budget for every subwatershed in the source protection area that:

- (1) was assigned a significant or moderate surface water stress level or a significant or moderate groundwater stress level in accordance with rule 21; and
- (2) from which an existing or planned type I, II or III system takes water.

23. Subject to rule 24, using the data underlying the Tier Two water budget for the subwatershed, assign every subwatershed in the source protection area for which a Tier Two water budget has been prepared a surface water stress level and a ground water stress level in accordance with Part III.4.

24. Rules 19, 20, 21, 22 and 23 do not apply if a water budget was prepared for every subwatershed in the source protection area prior to the area being subject to section 4 or 5 of the Act and those water budgets meet the requirements of a Tier Two water budget and include an assessment of the elements listed in rule 19.

25. Where rules 19, 20, 21, 22 and 23 do not apply as a result of the application of rule 24, using the data underlying the equivalent Tier Two water budgets described in rule 24, assign every subwatershed in the source protection area from which an existing or planned type I, II or III system takes water a surface water stress level and a ground water stress level in accordance with Part III.4.

26. Delineate a local area in respect of every surface water intake in the source protection area relating to an existing or planned type I, II or III system that takes water from a subwatershed assigned a surface water stress level of significant or moderate in accordance with rule 23.

27. Delineate a local area in respect of every well in the source protection area relating to an existing or planned type I, II or III system that takes water from a subwatershed assigned a groundwater stress level of significant or moderate in accordance with rule 23.

28. A local area delineated in accordance with rule 26 or 27 may be delineated in respect of one or more surface water intakes or wells relating to the same system, but shall not be delineated to include both intakes and wells.

29. Despite rule 27, a local area delineated in accordance with rule 26 or 27 may be delineated in respect of one or more surface water intakes or wells relating to a planned system and an existing system if the planned system will be connected to the existing system.

30. Prepare a Tier Three water budget for every local area delineated in accordance with rules 26 and 27.

31. Where the rules in Part III.3 and Part III.4 require that a percent demand calculation is undertaken in relation to a scenario,

- (1) the year for which an annual percent demand or twelve monthly percent demands shall be calculated is the study year;
- (2) data used to determine demand shall meet the requirements listed in Column 3 of Table 1 where a requirement in respect of all or part of the data is listed, and in all other cases the data shall be reflective of conditions that existed during the most recent period for which data is available and which parallels the duration and starting point of the study year;
- (3) data used to determine supply and reserve shall meet the requirements listed in Column 4 of Table 1 where a requirement in respect of all or part of the data is listed, and in all other cases the data shall be reflective of conditions that existed during the study year.

Part III.3 – Subwatershed stress levels – Tier One Water Budget

32. For the purposes of rule 21, a subwatershed shall be assigned a surface water stress level of significant, moderate or low in accordance with the following:

- (1) Significant, if during scenario A or B in Table 1 the maximum monthly percent water demand for surface water for the subwatershed would be greater than or equal to 50%.
- (2) Moderate, if a stress level was not assigned by subrule (1) and one or more of the following circumstances exist:
 - (a) During scenario A or B in Table 1 the maximum monthly percent water demand for surface water for the subwatershed would be less than 50% but greater than 20%.
 - (b) At any time after January 1, 1990, in relation to a type I, II or III system within the subwatershed:
 - (i) any part of a surface water intake was not below the water's surface during normal operation of the intake; or
 - (ii) the operation of a surface water intake pump was terminated because of an insufficient quantity of water being supplied to the intake.
 - (c) Both of the following are true:

(i) the result of one or more maximum monthly percent water demand calculations made in accordance with clause (a) of subrule (2) is between 18% and 20%, inclusive; and

(ii) a sensitivity analysis of the data used to prepare the Tier One Water Budget suggests that the stress level for the subwatershed could be moderate.

(3) Low, if a stress level was not assigned by either subrule (1) or subrule (2).

33. For the purposes of rule 21, a subwatershed shall be assigned a groundwater stress level of significant, moderate or low in accordance with the following:

(1) Significant, if during scenario A or B in Table 1 one or both of the following circumstances exist:

(a) The annual percent water demand for groundwater for the subwatershed would be greater than or equal to 25%.

(b) The maximum monthly percent water demand for groundwater for the subwatershed would be greater than or equal to 50%.

(2) Moderate, if a stress level was not assigned by subrule (1) and one or more of the following circumstances exist:

(a) During scenario A or B in Table 1 the annual percent water demand for groundwater for the subwatershed would be less than 25% but greater than 10%.

(b) During scenario A or B in Table 1 the maximum monthly percent water demand for groundwater for the subwatershed would be less than 50% but greater than 25%.

(c) At any time after January 1, 1990, in relation to a type I, II or III system within the subwatershed:

(i) the groundwater level in the vicinity of the well was not at a level sufficient for the normal operation of the well; or

(ii) the operation of a well pump was terminated because of an insufficient quantity of water being supplied to the well.

(d) Both of the following are true:

(i) the result of one or more annual percent water demand calculations made in accordance with clause (a) of subrule (2) is between 8% and 10%, inclusive; and

(ii) a sensitivity analysis of the data used to prepare the Tier One Water Budget suggests that the stress level for the subwatershed could be moderate.

(e) Both of the following are true:

(i) the result of one or more maximum monthly percent water demand calculations made in accordance with clause (b) of subrule (2) is between 23% and 25%, inclusive; and

(ii) a sensitivity analysis of the data used to prepare the Tier One Water Budget suggests that the stress level for the subwatershed could be moderate.

(3) Low, if a stress level was not assigned by either subrule (1) or subrule (2).

Table 1 – Subwatershed Stress Level Scenarios

Column 1	Column 2	Column 3	Column 4
Scenario	Description of the Scenario	Data Restrictions Demand	Data Restrictions Supply and Reserve
A	existing system - average		Data related to climate and stream flow shall be the historical data set for climate and stream flow.
B	existing system - future demand	Data related to demand associated with the system within the subwatershed shall be reflective of the future development in the subwatershed.	Data related to climate and stream flow shall be historical data set for climate and stream flow. Data related to land cover shall be reflective of the future development in the subwatershed.
C	planned system demand – operational year	Data related to demand associated with an existing type I, II or III system within the subwatershed shall be reflective of the demand that would exist in the year that the planned system will be operational.	Data set related to climate and stream flow shall be the historical data set for climate and stream flow. Data related land cover shall be reflective of the year that the planned system will be operational.

Column 1	Column 2	Column 3	Column 4
Scenario	Description of the Scenario	Data Restrictions Demand	Data Restrictions Supply and Reserve
D	existing system - two year drought		Data related to climate and stream flow shall be reflective of the two year drought period.
E	existing system - future two year drought	Data related to demand associated with an existing type I, II or III system within the subwatershed shall be reflective of the future development in the subwatershed.	Data related to climate and stream flow shall be reflective of the two year drought period. Data related to land cover shall be reflective of the future development in the subwatershed.
F	planned system - operational year - two year drought	Data related to demand associated with an existing type I, II or III system within the subwatershed shall be reflective of the demand that would exist in the year that the planned system will be operational.	Data related to climate and stream flow shall be reflective of the two year drought period. Data related to land cover shall be reflective of the future development that would exist in the subwatershed in the year that the planned system will be operational.
G	existing system - ten year drought		Data related to climate and stream flow shall be reflective of the ten year drought period.
H	existing system - future ten year drought	Data related to demand associated with an existing type I, II or III system within the subwatershed shall be reflective of the future development in the subwatershed.	Data related to climate and stream flow shall be reflective of the ten year drought period. Data related to land cover shall be reflective of the future development in the subwatershed.
I	Planned system – operational year - ten year drought	Data related to demand associated with an existing type I, II or III system within the subwatershed shall be reflective of the demand that would exist in the year that the planned system will be operational.	Data related to climate and stream flow shall be reflective of the ten year drought period. Data related to land cover shall be reflective of the future development that would exist in the subwatershed in the year that the planned system will be operational.

Part III.4 – Subwatershed stress levels – Tier Two Water Budgets

34. For the purposes of rule 23 or 25, a subwatershed shall be assigned a surface water stress level of significant, moderate or low in accordance with the following:

- (1) Significant, if one or both of the following circumstances exist:
 - (a) During scenario A or B in Table 1 the maximum monthly percent water demand for surface water for the subwatershed would be greater than or equal to 50%.
 - (b) Where there is a planned type I, II or III system proposed to be located within the subwatershed, during scenario C in Table 1 the maximum monthly percent water demand for surface water for the subwatershed would be greater than or equal to 50%.
- (2) Moderate, if a stress level was not assigned by subrule (1) and one or more of the following circumstances exist:
 - (a) During scenario A or B in Table 1 the maximum monthly percent water demand for surface water for the subwatershed would be less than 50% but greater than 20%.
 - (b) Where there is a planned type I, II or III system proposed to be located within the subwatershed, during scenario C in Table 1 the maximum monthly percent water demand for surface water for the subwatershed would be less than 50% but greater than 20%.
 - (c) At any time after January 1, 1990, in relation to a type I, II or III system within the subwatershed,
 - (i) any part of a surface water intake was not below the water's surface during normal operation of the intake, or
 - (ii) the operation of a surface water intake pump was terminated because of an insufficient quantity of water being supplied to the intake.
 - (d) In relation to a type I, II or III system within the subwatershed, either of the circumstances described in clause (c) would occur:
 - (i) during either or both of scenarios D and E; and
 - (ii) during either or both of scenarios G and H.

(e) In relation to a planned type I, II or III system proposed to be located within the subwatershed, either of the circumstances described in clause (c) would occur:

- (i) during any or all of scenarios D, E and F; and
- (ii) during any or all of scenarios G, H and I.

(f) All of the following are true:

- (i) the result of one or more maximum monthly percent water demand calculations made in accordance with subrule (2) is between 18% and 20%, inclusive;
- (ii) the uncertainty associated with the percent demand calculations required by this rule, when evaluated to be high or low considering the factors set out in rule 36, is high; and
- (iii) a sensitivity analysis of the data used to prepare the Tier Two Water Budget suggests that the stress level for the subwatershed could be moderate.

(3) Low, if a stress level was not assigned by either subrule (1) or subrule (2).

35. For the purposes of rule 23 or 25, a subwatershed shall be assigned a groundwater stress level of significant, moderate or low in accordance with the following,

(1) Significant, if one or more of the following circumstances exist:

- (a) During scenario A or B in Table 1 the annual percent water demand for groundwater for the subwatershed would be greater than or equal to 25%.
- (b) Where there is a planned type I, II or III system proposed to be located within the subwatershed, during scenario C in Table 1 the annual percent water demand for groundwater for the subwatershed would be greater than or equal to 25%.
- (c) During scenario A or B in Table 1 the maximum monthly percent water demand for groundwater for the subwatershed would be greater than or equal to 50%.
- (d) Where there is a planned type I, II or III system proposed to be located within the subwatershed, during scenario C in Table 1 the maximum monthly

percent water demand for groundwater for the subwatershed would be greater than or equal to 50%.

(2) Moderate, if a stress level was not assigned by subrule (1) and one or more of the following circumstances exist:

(a) During scenario A or B in Table 1 the annual percent water demand for groundwater for the subwatershed would be less than 25% but greater than 10%.

(b) Where there is a planned type I, II or III system proposed to be located within the subwatershed, during scenario C in Table 1 the annual percent water demand for groundwater for the subwatershed would be less than 25% but greater than 10%.

(c) During scenario A or B in Table 1 the maximum monthly percent water demand for groundwater for the subwatershed would be less than 50% but greater than 25%.

(d) Where there is a planned type I, II or III system proposed to be located within the subwatershed, during scenario C in Table 1 the maximum monthly percent water demand for groundwater for the subwatershed would be less than 50% but greater than 25%.

(e) At any time after January 1, 1990, in relation to a type I, II or III system within the subwatershed, either of the following circumstances occurred:

- (i) the groundwater level in the vicinity of the well was not at a level sufficient for the normal operation of the well; or
- (ii) the operation of a well pump was terminated because of an insufficient quantity of water being supplied to the well.

(f) In relation to a type I, II or III system within the subwatershed, either of the circumstances described in clause (e) would occur:

- (i) during either or both of scenarios D and E; and
- (ii) during either or both of scenarios G and H.

(g) In relation to a planned type I, II or III system proposed to be located within the subwatershed, either of the circumstances described in clause (e) would occur:

- (i) during any or all of scenarios D, E and F; and

(ii) during any or all of scenarios G, H and I.

(h) All of the following are true:

(i) the result of one or more annual percent water demand calculations made in accordance with subclause (a) or (b) of subrule (2) is between 8% and 10%, inclusive;

(ii) the uncertainty associated with the percent demand calculations required by this rule, when evaluated to be high or low considering the factors set out in rule 36, is high;

(iii) a sensitivity analysis of the data used to prepare the Tier Two Water Budget suggests that the stress level for the subwatershed could be moderate.

(i) All of the following are true:

(i) the result of one or more maximum monthly percent water demand calculations made in accordance with clause (c) or (d) of subrule (2) is between 23% and 25%, inclusive;

(ii) the uncertainty associated with the percent demand calculations required by this rule, when evaluated to be high or low considering the factors set out in rule 36, is high;

(iii) a sensitivity analysis of the data used to prepare the Tier Two Water Budget suggests that the stress level for the subwatershed could be moderate.

(3) Low, if a stress level was not assigned by either subrule (1) or subrule (2).

Uncertainty analysis

36. The following factors shall be considered in an analysis of uncertainty required by subclauses 34(2)(f)(ii) and 35(2)(h)(ii):

(1) the distribution, variability, quality and relevance of the available input data;

(2) the ability of the methods and models used to accurately reflect the hydrologic system;

(3) the quality assurance and quality control procedures applied; and

(4) the extent and level of calibration and validation achieved for any groundwater and surface models used or calculations and general assessments completed.

Part IV – Groundwater Vulnerability Assessment

Part IV.1 - Vulnerability Assessment and Delineation, Groundwater

37. The vulnerability of groundwater within a source protection area shall be assessed using one or more of the following groundwater vulnerability assessment methods,

- (1) intrinsic susceptibility index;
- (2) aquifer vulnerability index;
- (3) surface to aquifer advection time;
- (4) surface to well advection time, or
- (5) a method that in the opinion of the Director is equivalent or better than the methods permitted by subrules (1) through (4).

38. A source protection area shall be delineated into areas of high, medium or low groundwater vulnerability, high corresponding to greater vulnerability, as follows;

- (1) where a method described in subrule 37(1) or (2) was used to assess vulnerability;
 - (a) areas of high vulnerability are those areas with scores that are less than 30,
 - (b) areas of medium vulnerability are those areas with scores that are greater than or equal to 30 but less than or equal to 80, and
 - (c) areas of low vulnerability are those areas with scores that are greater than 80;
- (2) where a method described in subrule 37(3) or (4) was used to assess vulnerability;
 - (a) areas of high vulnerability are those areas with results that are less than 5 years;
 - (b) areas of medium vulnerability are those areas with results that are greater than or equal to 5 years but less than or equal to 25 years, and
 - (c) areas of low vulnerability are those areas with results that are greater than 25 years, or

(3) where a method described in 37(5) was used to assess vulnerability, using a methodology that in the opinion of the Director is comparable to the assignment of vulnerability categories in subrules (1) and (2).

Vulnerability increase, transport pathways

39. Where the vulnerability of an area identified as low in accordance with rule 38 is increased because of the presence of a transport pathway that is anthropogenic in origin, the area shall be identified as an area of medium or high vulnerability, high corresponding to greater vulnerability.

40. Where the vulnerability of an area identified as medium in accordance with rule 38 is increased because of the presence of a transport pathway that is anthropogenic in origin, the area shall be identified as an area of high vulnerability.

41. When determining whether the vulnerability of an area is increased for the purpose of rules 39 and 40 and the degree of the increase, the following factors shall be considered:

- (1) hydrogeological conditions;
- (2) the type and design of any transport pathways;
- (3) the cumulative impact of any transport pathways; and
- (4) the extent of any assumptions used in the assessment of the vulnerability of the groundwater.

Part V – Delineation of Vulnerable Areas: Highly Vulnerable Aquifers, Significant Groundwater Recharge Areas and Wellhead Protection Areas

42. Where the rules in this Part require that the extent of an area be determined by time of travel to a wellhead, only the following models and methods may be used,

- (1) a computer based three-dimensional groundwater flow model,
- (2) two-dimensional analytical model,
- (3) uniform flow method,
- (4) calculated fixed radius method, or
- (5) a method that in the opinion of the Director is equivalent or better than those permitted by (1) through (4).

Part V.1 - Delineation of highly vulnerable aquifers

43. An area identified as an area of high groundwater vulnerability in accordance with Part IV and the subsurface beneath that area shall be delineated as a highly vulnerable aquifer.

Part V.2 - Delineation of significant groundwater recharge areas

44. Subject to rule 45, an area is a significant groundwater recharge area if,

- (1) the area annually recharges water to the underlying aquifer at a rate that is greater than the rate of recharge across the whole of the related groundwater recharge area by a factor of 1.15 or more; or
- (2) the area annually recharges a volume of water to the underlying aquifer that is 55% or more of the volume determined by subtracting the annual evapotranspiration for the whole of the related groundwater recharge area from the annual precipitation for the whole of the related groundwater recharge area.

45. Despite rule 44, an area shall not be delineated as a significant groundwater recharge area unless the area has a hydrological connection to a surface water body or aquifer that is a source of drinking water for a drinking water system.

46. The areas described in rule 44 shall be delineated using the models developed for the purposes of Part III of these rules and with consideration of the topography, surficial geology, and how land cover affects groundwater and surface water.

Part V.3 - Delineation of wellhead protection areas, type I systems

47. A wellhead protection area for a well associated with a type I system is the area created by combining all of the following areas,

- (1) area WHPA-A, being the surface and subsurface area centred on the well with an outer boundary identified by a radius of 100 metres;
- (2) area WHPA-B, being the surface and subsurface areas within which the time of travel to the well is less than or equal to two years but excluding WHPA-A;
- (3) area WHPA-C, being the surface and subsurface areas within which the time of travel to the well is less than or equal to five years but greater than two years;
- (4) area WHPA-D, being the surface and subsurface areas within which the time of travel to the well is less than or equal to twenty-five years but greater than five years;
- (5) area WHPA-E, being the area delineated in accordance with the rules in Part VI that apply to the delineation of an IPZ-2, as if an intake for the system were located:
 - (a) at the point of interaction between groundwater that is the source of raw water supply for the well and the surface water that is directly influencing that groundwater; or
 - (b) at the point in the surface water body influencing the raw water supply for the well that is closest in proximity to the well, if the point of interaction described in (a) is not known.
- (6) area WHPA-F, being the area delineated in accordance with the rules in Part VI that apply to the delineation of an IPZ-3, as if an intake for the system were located in the surface water body influencing the well at the point closest in proximity to the well.

48. Despite rule 47, where a zone representing a ten year time of travel was delineated for the well in a report prepared prior to April 30, 2005 and a five year time of travel has not been delineated for the well in a report prepared after that date, the wellhead protection area for a well associated with a type I system is the area created by combining all of the following areas,

- (1) area WHPA-A, delineated in accordance with the requirements of subrule 47(1);
- (2) area WHPA-B, delineated in accordance with the requirements of subrule 47(2);

(3) area WHPA-C1, being the surface and subsurface areas within which the time of travel to the well is less than or equal to ten years but greater than two years;

(4) area WHPA-D, being the surface and subsurface areas within which the time of travel to the well is less than or equal to twenty-five years but greater than ten years;

(5) area WHPA-E, delineated in accordance with the requirements of subrule 47(5); and

(6) area WHPA-F, delineated in accordance with the requirements of subrule 47(6).

49. Despite subrules 47(5) and 48(5), area WHPA-E shall only be added to a wellhead protection area where:

(a) the well obtains water from a raw water supply that is groundwater under the direct influence of surface water as determined in accordance with subsection 2 (2) of O. Reg. 170/03 (Drinking Water Systems) made under the *Safe Drinking Water Act, 2002*;

(b) a determination has not been made under subsection 2 (3) of O. Reg. 170/03 (Drinking Water Systems) that subsection 2 (2) of that regulation does not apply; and

(c) the interaction between surface water and groundwater has the affect of decreasing the time of travel of water to the well when compared to the time it would take water to travel to the well if the raw water supply for the well was not under the direct influence of surface water.

50. Despite subrules 47(6) and 48(6), area WHPA-F shall only be added to a wellhead protection area where,

(1) the wellhead protection area contains a WHPA-E;

(2) a drinking water issue is identified in accordance with Part XI.1 in relation to the well; and

(3) the source of the drinking water issue described in subrule (2) originates outside of areas WHPA-A, WHP-B, WHPA-C, WHPA-C1 if any, WHPA-D and WHPA-E.

Part V.4 - Delineation of wellhead protection areas, type II and III systems

51. The wellhead protection area for a well associated with a type II or III system to which O. Reg. 170/03 (Drinking Water Systems) made under the *Safe Drinking*

Water Act, 2002, O. Reg. 318/08 (Transitional – Small Drinking Water Systems) made under the *Health Protection and Promotion Act* or O. Reg. 319/08 (Small Drinking Water Systems) made under the *Health Protection and Promotion Act* applies, is the area created by combining all of the following areas:

- (1) area WHPA-A, being the surface and subsurface area centred on the well with an outer boundary identified by a radius of 100 metres;
- (2) area WHPA-B, being the surface and subsurface areas within which the time of travel to the well is less than or equal to two years but excluding WHPA-A;
- (3) area WHPA-C, being the surface and subsurface areas within which the time of travel to the well is less than or equal to five years but greater than two years; and
- (4) area WHPA-D, being the surface and subsurface areas within which the time of travel to the well is less than or equal to twenty-five years but greater than five years.

52. The wellhead protection area for a wellhead associated with a type II or III system to which none of the regulations described in rule 51 apply, is the area created by combining all of the following areas:

- (1) area WHPA-A, being the surface and subsurface area centred on the well with an outer boundary identified by a radius of 100 metres; and
- (2) area WHPA-B, being the surface and subsurface areas within which the time of travel to the well is less than or equal to two years but excluding WHPA-A.

Part V.5 – Delineation of WHPA-Q1 or WHPA-Q2

53. A wellhead protection area shall include the following areas if the relating well takes water from a subwatershed assigned a groundwater stress level of moderate or significant in accordance with Part III.4:

- (1) area WHPA-Q1, being the combined area that is the cone of influence of the well and the whole of the cones of influence of all other wells that intersect that area; and
- (2) area WHPA-Q2, being the area described in subrule (1) and any area where a future reduction in recharge would significantly impact that area.

54. The model used in Part III to prepare the water budget for the local area that contains the well described in rule 53 shall be used to delineate WHPA-Q1 and WHPA-Q2.

Part VI – Delineation of Vulnerable Areas: Surface Water Intake Protection Zones

Part VI.1 – General

Classification of intakes

55. A surface water intake associated with a type I, II or III system shall be classified as a:

- (1) type A intake if the intake is or, if the intake is associated with a planned drinking water system, would be located in a Great Lake;
- (2) type B intake if the intake is or, if the intake is associated with a planned drinking water system, would be located in a connecting channel;
- (3) type C intake if the intake is or, if the intake is associated with a planned drinking water system, would be located in a river and neither the direction nor rate of the flow of the water at the intake is affected by a water impoundment structure; or
- (4) type D intake if the intake is not described in subrule (1) (2) or (3).

Identification of surface water bodies

56. Where these rules require the delineation of an IPZ-2 or an IPZ-3, the Water Virtual Flow – Seamless Provincial Data Set and the Water Poly Segment data layers housed in the Ontario Land Information Warehouse shall be used to identify the surface water bodies to be included in the IPZ-2 or IPZ-3, as the case may be.

57. Where there is no data in respect of the subwatershed in which the drinking water system related to the IPZ-2 or IPZ-3 is located in the Water Virtual Flow – Seamless Provincial Data Set data layer or in the Water Poly Segment data layer housed in the Ontario Land Information Warehouse, or where the data in the data layers is not sufficient to allow conclusions to be drawn with respect to the surface water bodies to be included in the IPZ-2 or IPZ-3, as the case may be, a computer based geographical information system shall be used to identify the surface water bodies to be included in the IPZ-2 or IPZ-3.

Part VI.2 - Area of surface water intake protection zones

58. A surface water intake protection zone for a surface water intake associated with a type I system or a type II or type III system to which O. Reg. 170/03 (Drinking Water Systems) made under the *Safe Drinking Water Act, 2002*, O. Reg. 318/08 (Transitional – Small Drinking Water Systems) made under the *Health Protection and Promotion Act* or O. Reg. 319/08 (Small Drinking Water Systems) made under the

Health Protection and Promotion Act applies, is the area created by combining all of the following areas:

- (1) area IPZ-1, delineated in accordance with the rules in Part VI.3, as applicable;
- (2) area IPZ-2, delineated in accordance with the rules in Parts VI.4 and VI.6, as applicable;
- (3) area IPZ-3, delineated in accordance with the rules in Parts VI.5 and VI.6, as applicable; and
- (4) area IPZ-Q, delineated in accordance with the rules in Part VI.7, as applicable.

59. A surface water intake protection zone for a surface water intake associated with a type II or type III system to which none of the regulations described in rule 58 apply, is the area created by combining all of the following areas:

- (1) area IPZ-1, delineated in accordance with the rules in Part VI.3 and
- (2) area IPZ-Q, delineated in accordance with rules in Part VI.7, as applicable.

60. An area delineated in accordance with Parts VI.3 to Part VI.7 includes all surface and subsurface land, water and beds under the water within the boundary of the area delineated.

Part VI.3 - Delineation of IPZ-1

61. An area known as IPZ-1 shall be delineated in respect of each surface water intake associated with a drinking water system described in rules 58 and 59 and shall be composed of the following areas:

- (1) the area within each surface water body that is:
 - (a) within a circle that has a radius of 1000 metres centered on the crib of the intake, if the intake is a type A or type D intake or a type C intake to which rule 62 applies;
 - (b) within a semi-circle that has a radius of 1000 metres extending upstream from the crib of the intake and a rectangle with a length of 2000 metres centred on the crib of the intake and a width of 100 metres extending downstream from the crib of the intake, if the intake is a type B intake;
 - (c) within a semi-circle that has a radius of 200 metres extending upstream from the crib of the intake and a rectangle with a length of 400 metres centred

on the crib of the intake and a width of 10 metres downstream of the intake, if the intake is a type C intake and rule 62 does not apply.

- (2) where the area delineated in accordance with subrule (1) abuts land,
 - (a) a setback of not more than 120 metres inland along the abutted land measured from the high water mark of the surface water body that encompasses the area where overland flow drains into the surface water body; and
 - (b) the area of the Regulation Limit along the abutted land.

62. Despite rule 58, the area described in clause 61(2)(b) shall not be included in an IPZ-1 related to the drinking water system serving the Town of Wallaceburg, located at 6750 Baseline Road, in the Municipality of Chatham-Kent, described in amended certificate of approval No. 4529-6GAQXJ issued on September 19, 2005 under the *Safe Drinking Water Act, 2002*.

63. The area of an IPZ-1 in a surface water body may be delineated in accordance with subrule 61(1)(a) if the relating surface water body intake is a Type C intake and, having regard to the direction and rate of the flow of the water at the intake, it would be reasonable to do so to protect the quality of the water that may enter the intake.

64. The area of an IPZ-1 in a surface water body may be modified to reflect local hydrodynamic conditions affecting stream flow if the intake related to the IPZ-1 is a type B or type C intake.

Part VI.4 - Delineation of IPZ-2

65. An area known as IPZ-2 shall be delineated for each surface water intake associated with a drinking water system described in rule 58, and shall be composed of the following areas:

- (1) the area within each surface water body that may contribute water to the intake where the time of travel to the intake, subject to rule 66, is equal to or less than the time that is sufficient to allow the operator of the system to respond to an adverse condition in the quality of the surface water;
- (2) the area within the storm sewershed of each storm sewer that discharges into a surface water body that may contribute water to the intake where the time of travel to the intake, subject to rule 66, is equal to or less than the time that is sufficient to allow the operator of the system to respond to an adverse condition in the quality of the surface water;
- (3) where the area delineated in accordance with subrule (1) abuts land,

(a) a setback of not more than 120 metres inland along the abutted land measured from the high water mark of the surface water body that encompasses the area where overland flow drains into the surface water body; and

(b) the area of the Regulation Limit along the abutted land.

66. For the purposes of subrules 65(1) and 65(2), where the time that is sufficient to allow the operator of the system to respond to an adverse condition in the quality of the surface water is less than two hours, the time of travel to the surface water body intake shall be deemed to be two hours.

67. Despite rule 65, the area described in clause 65(3)(b) shall not be included in an IPZ-2 related to the drinking water system serving the Town of Wallaceburg, located at 6750 Baseline Road, in the Municipality of Chatham-Kent, described in amended certificate of approval No. 4529-6GAQXJ issued on September 19, 2005 under the *Safe Drinking Water Act, 2002*.

Part VI.5 - Delineation of IPZ-3

68. An area known as IPZ-3 shall be delineated for each type A and type B surface water intake and each type C and type D surface water intake located in Lake Nippising, Lake Simcoe, Lake St. Clair or the Ottawa River, associated with a drinking water system described in rule 58 and shall be composed of the following areas:

(1) Subject to rule 69, the area within each surface water body through which, modeling demonstrates, contaminants released during an extreme event may be transported to the intake;

(2) where the area delineated in accordance with subrule (1) abuts land,

(a) a setback of not more than 120 metres inland along the abutted land measured from the high water mark of the surface water body that encompasses the area where overland flow drains into the surface water body; and

(b) the area of the Regulation Limit along the abutted land.

69. The area delineated in accordance with subrule 68(1) shall not exceed the area within each surface water body that may contribute water to the intake during or as a result of an extreme event.

70. An area known as IPZ-3 shall be delineated for each type C and type D surface water intake that is not located in Lake Nippising, Lake Simcoe, Lake St. Clair or the

Ottawa River, associated with a drinking water system described in rule 58 and shall be composed of the following areas:

- (1) the area within each surface water body that may contribute water to the intake;
- (2) where the area delineated in accordance with subrule (1) abuts land,
 - (a) a setback of not more than 120 metres inland along the abutted land measured from the high water mark of the surface water body that encompasses the area where overland flow drains into the surface water body; and
 - (b) the area of the Regulation Limit along the abutted land.

71. Despite rule 68, the area described in clause 68(2)(b) shall not be included in an IPZ-3 related to the drinking water system serving the Town of Wallaceburg, located at 6750 Baseline Road, in the Municipality of Chatham-Kent, described in amended certificate of approval No. 4529-6GAQXJ issued on September 19, 2005 under the *Safe Drinking Water Act, 2002*.

Part VI.6 - Transport Pathways

72. Where an area that is an IPZ-2 or IPZ-3 includes a setback from a surface water body delineated in accordance with subrules 65(3), 68(2) or 70(2) the area may be extended to include an area that contributes water to the IPZ-2 or IPZ-3, as the case may be, through a transport pathway.

73. When determining the extent to which the IPZ-2 or IPZ-3 shall be extended for the purpose of rule 72, the following factors shall be considered:

- (1) the hydrological and hydrogeological conditions in the area that contributes water to the intake protection zone through the transport pathway; and
- (2) the design of the pathway, if it is an transport pathway that is anthropogenic in origin.

74. Despite rules 65, 66 and 72, an IPZ-2 shall not include an area of land or water that lies within an IPZ-1.

75. Despite rules 68, 70 and 72, an IPZ-3 shall not include an area of land or water that lies within an IPZ-1 or an IPZ-2.

Part VI.7 - Delineation of IPZ-Q

76. A surface water intake protection zone shall include an area know as IPZ-Q if the relating intake takes water from a subwatershed assigned a surface water stress level of moderate or significant in accordance with Part III.4.

77. The boundary of the IPZ-Q described in rule 76 is the local area delineated in accordance with Part III.2 that relates to the surface water intake.

78. The models required to be used by Part III in the preparation of the water budget for the local area shall be used to delineate IPZ-Q.

Part VII – Vulnerability: Highly Vulnerable Aquifers, Significant Groundwater Recharge Areas and Wellhead Protection Areas

Part VII.1 - Highly vulnerable aquifers

79. That part of a highly vulnerable aquifer that does not overlap with a wellhead protection area shall be assigned a vulnerability score of 6.

Part VII.2 - Significant groundwater recharge areas

80. A significant groundwater recharge area shall be subdivided by the areas of groundwater vulnerability identified in accordance with Part IV rule 38.

81. The areas identified in accordance with rule 80 shall be assigned a vulnerability score of;

- (1) 6, where the groundwater vulnerability for the area is high;
- (2) 4, where the groundwater vulnerability for the area is medium, or
- (3) 2, where the groundwater vulnerability for the area is low.

Part VII.3 - Wellhead protection areas

82. A wellhead protection area shall be subdivided by the boundaries of the areas of groundwater vulnerability identified in accordance with Part V rule 38.

83. The areas identified in accordance with rule 82 that are not within WHPA-Q1 or WHPA-Q2 shall be assigned a vulnerability based upon their location within the areas identified in Part V rules 47 or 48 in accordance with:

- (1) Table 2(a) and rules 84 and 85 where the vulnerability of groundwater was determined by the use of a method listed in Part V subrules 42(1) or 42(2),
- (2) Table 2(b) and rules 84 and 85 where the vulnerability of groundwater was determined by the use of a method listed in Part V subrules 42(3) or 42(4), or
- (3) a method that in the opinion of the Director is substantially equivalent to the methods described in subrules (1) and (2), where the vulnerability of groundwater was determined by the use of a method listed in Part V subrule 42(5).

Table 2(a): Wellhead Protection Area Vulnerability Scores – ISI or AVI

Groundwater Vulnerability Category for the Area	Location Within a Well Head Protection Area				
	WHPA-A	WHPA-B	WHPA-C	WHPA-C1	WHPA-D
High	10	10	8	8	6
Medium	10	8	6	6	4
Low	10	6	4	4	2

Table 2(b): Wellhead Protection Vulnerability Scores – SAAT or SWAT

Groundwater Vulnerability Category for the Area	Location Within a Well Head Protection Area				
	WHPA-A	WHPA-B	WHPA-C	WHPA-C1	WHPA-D
High	10	10	8	8	6
Medium	10	8	6	6	4
Low	10	6	2	2	2

84. The areas identified in accordance with rule 82 that are located in WHPA-E shall be assigned a vulnerability score in accordance with the rules in Part VIII that apply to an IPZ-2.

85. The areas identified in accordance with rule 82 that are located in WHPA-F shall be assigned a vulnerability score in accordance with the rules in Part VIII that apply to an IPZ-3.

Part VIII – Vulnerability: Surface Water Intake Protection Zones

Part VIII.1 - Vulnerability scores

86. A vulnerability score shall be assigned to each IPZ-1 and IPZ-2 associated with a type A, B, C or D intake and to each area of an IPZ-3 associated with a type C or type D intake.

87. The vulnerability score assigned to each IPZ-1, IPZ-2 and each area of an IPZ-3 associated with a type C or type D intake shall be calculated in accordance with the following formula,

$$B \times C$$

Where,

B = the area vulnerability factor of the area of the surface water intake protection zone determined in accordance with rules 88 to 93; and

C = the source vulnerability factor of the surface water intake protection zone determined in accordance with rules 94 and 96.

Part VIII.2 - Area vulnerability factor

88. An IPZ-1 shall be assigned an area vulnerability factor of 10.

89. An IPZ-2 shall be assigned an area vulnerability factor that is not less than 7 and not more than 9 based on the vulnerability of the area where a higher factor corresponds to a higher vulnerability.

90. One or more area vulnerability factors that are not less than 1 and not greater than 9 shall be assigned to each area within an IPZ-3 associated with a type C or type D intake based on the vulnerability of the area within the IPZ-3 where a higher factor corresponds to a higher vulnerability.

91. An area vulnerability factor that is assigned to an IPZ-3 or an area within an IPZ-3 shall not be greater than the area vulnerability factor assigned to the IPZ-2 within the surface water intake protection zone.

92. When determining the area vulnerability factor to be assigned to an IPZ-2 or an area within an IPZ-3 for the purpose of rule 89 or 90, the following factors shall be considered:

- (1) the percentage of the area of the IPZ-2 or IPZ-3, as the case may be, that is composed of land;

- (2) the land cover, soil type, permeability of the land and the slope of any setbacks;
- (3) the hydrological and hydrogeological conditions in the area that contributes water to the area through transport pathways;
- (4) in respect of an IPZ-3, the proximity of the area of the IPZ-3 to the intake.

93. An area vulnerability factor assigned for the purpose of rule 89 or 90 shall be expressed as a whole number.

Part VIII.3 - Source vulnerability factor

94. A source vulnerability factor shall be assigned to each surface water intake protection zone related to a type I, II or III system in accordance with Table 3 where a factor of 1 corresponds to a higher vulnerability.

95. When determining the source vulnerability factor to be assigned to a surface water intake protection zone, the following factors shall be considered:

- (1) the depth of the intake from the top of the water surface,
- (2) the distance of the intake from land;
- (3) the number of recorded drinking water issues related to the intake, if any.

Table 3 – Source Vulnerability Factors

Intake Type	Source Vulnerability Factor
type A intake	0.5 to 0.7
type B intake	0.7 to 0.9
type C intake	0.9 or 1
type D intake	0.8 to 1

96. A source vulnerability factor assigned for the purpose of rule 94 may be expressed to one decimal place.

Part IX – Local area Risk Level

Part IX.1 - Risk level, local area

97. Every local area required to be delineated in accordance with Part III shall be assigned:

- (1) an exposure level in accordance with Part IX.2; and
- (2) if the local area relates to an existing drinking water system, a tolerance level in accordance with Part IX.3.

98. Subject to rule 100, a local area relating to one or more surface water intakes or wells connected to an existing drinking water system, a planned system if the planned system will be connected to an existing drinking water system, or a planned system and an existing drinking water system if the planned system will be connected to the existing drinking water system shall be assigned a risk level in accordance with the following:

- (1) Significant, if the local area has an exposure level of high and the system has a tolerance level of low.
- (2) Moderate, if the local area has an exposure level of high and the system has a tolerance level of high.
- (3) Moderate, if the local area has an exposure level of low and the system has a tolerance level of low.
- (4) Low, if the local area has an exposure level of low and the system has a tolerance level of high.

99. A local area relating to one or more surface water intakes or wells connected to a planned system that will not be connected to an existing system shall be assigned a risk level in accordance with the following,

- (1) Significant, if the local area has an exposure level of high.
- (2) Low, if the local area has an exposure level of low.

100. Despite subrules 98(2) and 98(3), a local area relating to an existing system has a risk level of significant if,

- (1) uncertainty determined in accordance with rule 108 is high, and
- (2) a sensitivity analysis of the data used to prepare the water budget for the local area suggests that the risk level for the local area could be significant.

Part IX.2 - Exposure level, local area

101. A local area has an exposure level of high if, after accounting for the quantity of water required by other uses in the area, one or more of the following circumstances exist:

- (1) If the local area relates to one or more existing surface water intakes, at any time during scenario A or B in Table 4 the quantity of water that could have been taken from surface water bodies in the local area would not have been sufficient to meet the quantity of water taken by those surface water intakes.
- (2) If the local area relates to one or more existing wells, at any time during scenario C or D in Table 4 the quantity of water that could have been taken from groundwater in the local area would not have been sufficient to meet the quantity of water taken by those wells.
- (3) If the local area relates to one or more surface water intakes for a planned system or an existing system with a committed demand greater than 0 L/s, at any time during scenario E or F in Table 4 the quantity of water that can be taken from surface water bodies in the local area would not be sufficient to meet the allocated quantity of water for those surface water intakes.
- (4) If the local area relates to one or more wells for a planned system or an existing system with a committed demand greater than 0 L/s, at any time during scenario G or H in Table 4 the quantity of water that can be taken from groundwater in the local area would not be sufficient to meet the allocated quantity of water for those wells.

102. For the purposes of assessing the circumstances described in rule 101:

- (1) the time period to be assessed is the time period described in Column 2 of Table 4; and
- (2) the data used shall meet the requirements listed in Column 3 of Table 4 where one or more parameters in respect of the data are listed, and in all other cases the data shall be reflective of conditions that existed during the time period.

Table 4 – Exposure Scenarios

Column 1 Scenario	Column 2 Time Period	Column 3 Data Restrictions
A	The period for which climate and stream flow data are available for the local area	Data related to average daily pumping rates for water takings and land cover reflect conditions during the study year.
B	two year drought period	Data related to average daily pumping rates for water takings and land cover reflect conditions during the study year.
C	The period for which climate and stream flow data are available for the local area	Data related to average monthly pumping rates for water takings and land cover reflect conditions during the study year.
D	ten year drought period	Data related to average monthly pumping rates for water takings and land cover reflect conditions during the study year.
E	The period for which climate and stream flow data are available for the local area	Data related to average daily pumping rates for water takings and land cover reflect conditions during the year in which the planned system is operating at its allocated quantity.
F	two year drought period	Data related to average daily pumping rates for water takings and land cover reflect conditions during the year in which the planned system is operating at its allocated quantity.
G	The period for which climate and stream flow data are available for the local area	Data related to average monthly pumping rates for water takings and land cover reflect conditions during the year in which the planned system is operating at its allocated quantity.
H	ten year drought period	Data related to average monthly pumping rates and land cover reflect conditions during the year in which the planned system is operating at its allocated quantity.

103. For the purposes of rule 101 the other uses of water in the area are,

(1) with respect to surface water,

(a) waste water assimilation,

- (b) surface water takings downstream of the intake or intakes,
 - (c) electric power generation,
 - (d) navigation,
 - (e) recreation,
 - (f) aquatic habitat, and
 - (g) provincially significant wetlands; and
- (2) with respect to groundwater,
- (a) down gradient groundwater takings by other persons in the area,
 - (b) aquatic habitat, and
 - (c) provincially significant wetlands.

104. The quantity of water required by a use listed in rule 103 for the purposes of rule 101 is the maximum annual quantity of water taken by or used by the use during 2003 to 2007, inclusive.

105. The models used in Part III to prepare the water budget for the local area shall be used to assess the scenarios described in rule 101.

106. Where a local area was not assigned an exposure level of high in accordance with rule 101, the local area has an exposure level of low.

Part IX.3 - Tolerance level, existing drinking water systems

107. An existing type I, II or III system has the following tolerance level,

- (1) High, if the system obtains water from a surface water intake relating to a local area assessed in accordance with the circumstances described in 101(1) and at all times during that assessment, the system would have been capable of meeting the peak demands of users of the system.
- (2) High, if the system obtains water from a well relating to a local area assessed in accordance with the circumstances described in 101(2) and at all times during that assessment, the system would have been capable of meeting the peak demands of users of the system.
- (3) Low, if a tolerance level is not assigned in accordance with either of subrules (1) or (2).

Part IX.4 - Uncertainty analysis

108. For the purpose of subrule 100(1), an analysis of the uncertainty, characterized as high or low, shall be made in respect of;

- (1) the exposure level for the local area calculated in accordance with Part IX.2; and
- (2) the risk level for the local area assigned in accordance with subrules 98(2) and 98(3).

109. The following factors shall be considered in an analysis of uncertainty under rule 108:

- (1) the distribution, variability, quality and relevance of the available input data;
- (2) the ability of the methods and models used to accurately reflect the hydrologic system;
- (3) the quality assurance and quality control procedures applied; and
- (4) the extent and level of calibration and validation achieved for any groundwater and surface models used or calculations and general assessments completed.

Part X – Drinking Water Threats: Water Quantity

Part X.1 – Listing of drinking water threats

110. The activities prescribed to be drinking water threats for a vulnerable area in paragraphs 19 and 20 of subsection 1.1(1) of O. Reg. 287/07 (General) may be collectively listed in the assessment report as “the activities prescribed to be drinking water threats in paragraphs 19 and 20 of subsection 1.1(1) of O. Reg. 287/07 (General)”.

Part X.2 – Listing of significant and moderate drinking water threats

111. An activity listed in Column 1 of Table 5 is a significant drinking water threat in the circumstances and the areas within a vulnerable area set out opposite to the activity in Columns 2 and 3 respectively.

112. An activity listed in Column 1 of Table 5 is a moderate drinking water threat in the circumstances and the areas within a vulnerable area set out opposite to the activity in Columns 2 and 4 respectively.

113. For the purposes of Table 5, “existing taking” in respect of an activity means the historical average annual quantity of water taken by that activity.

Table 5 – Water Quantity Drinking Water Threats and Significant Drinking Water Threats

Column 1 Activity (Drinking Water Threat)	Column 2 Circumstances	Column 3 Area where Activity is a Significant Drinking Water Threat	Column 4 Area where Activity Moderate Drinking Water Threat
An activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body.	<ol style="list-style-type: none">1. An existing taking, an increase to an existing taking or a new taking.2. The water is or would be taken from within an IPZ-Q.	The local area from which the water is or would be taken if the area relates to one or more surface water intakes and it was assessed to have a risk level of significant in accordance with Part IX.	The local area from which the water is or would be taken if the area relates to one or more surface water intakes and it was assessed to have a risk level of moderate in accordance with Part IX.

Column 1 Activity (Drinking Water Threat)	Column 2 Circumstances	Column 3 Area where Activity is a Significant Drinking Water Threat	Column 4 Area where Activity Moderate Drinking Water Threat
<p>An activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body.</p>	<ol style="list-style-type: none"> 1. An existing taking, an increase to an existing taking or a new taking. 2. The water is or would be taken from within a WHPA-Q1. 	<p>The local area from which the water is or would be taken if the area relates to one or more wells and it was assessed to have a risk level of significant in accordance with Part IX.</p>	<p>The local area from which the water is or would be taken if the area relates to one or more wells and it was assessed to have a risk level of moderate in accordance with Part IX.</p>
<p>An activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body.</p>	<ol style="list-style-type: none"> 1. An increase to an existing taking or a new taking. 2. Section 34 of the <i>Ontario Water Resources Act</i> requires a permit to take water in respect of the increase or new taking. 3. The water is or would be taken from within an IPZ-Q. 4. Despite the local area from which the water is or would be taken having been assessed for the purposes of the latest assessment report to have a risk level or moderate in accordance with Part IX, the local area would be assessed to have a risk level of significant if the increase to the existing taking or the new taking were factored into the risk level assessment. 	<p>The local area from which the water is or would be taken if the area relates to one or more surface water intakes and it was assessed to have a risk level of moderate in accordance with Part IX.</p>	

Column 1 Activity (Drinking Water Threat)	Column 2 Circumstances	Column 3 Area where Activity is a Significant Drinking Water Threat	Column 4 Area where Activity Moderate Drinking Water Threat
<p>An activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body.</p>	<ol style="list-style-type: none"> 1. An increase to an existing taking or a new taking. 2. The water is or would be taken from within a WHPA-Q1. 3. Section 34 of the <i>Ontario Water Resources Act</i> requires a permit to take water in respect of the increase or new taking. 4. Despite the local area from which the water is or would be taken having been assessed for the purposes of the latest assessment report to have a risk level of moderate in accordance with Part IX, the local area would be assessed to have a risk level of significant if the increase to the existing taking or the new taking were factored into the risk level assessment. 	<p>The local area from which the water is or would be taken if the area relates to one or more wells and it was assessed to have a risk level of moderate in accordance with Part IX.</p>	
<p>An activity that reduces recharge to an aquifer.</p>	<ol style="list-style-type: none"> 1. An existing activity, a modified activity or a new activity. 2. The activity is or would be wholly or partly located within an IPZ-Q. 	<p>The local area from which the water is or would be taken if the area relates to one or more surface water intakes and it was assessed to have a risk level of significant in accordance with Part IX.</p>	<p>The local area from which the water is or would be taken if the area relates to one or more surface water intakes and it was assessed to have a risk level of moderate in accordance with Part IX.</p>

Column 1 Activity (Drinking Water Threat)	Column 2 Circumstances	Column 3 Area where Activity is a Significant Drinking Water Threat	Column 4 Area where Activity Moderate Drinking Water Threat
An activity that reduces recharge to an aquifer.	<ol style="list-style-type: none"> 1. An existing activity, a modified activity or a new activity. 2. The activity is or would be wholly or partly located within a WHPA-Q2. 	The local area from which the water is or would be taken if the area relates to one or more wells and it was assessed to have a risk level of significant in accordance with Part IX.	The local area from which the water is or would be taken if the area relates to one or more wells and it was assessed to have a risk level of moderate in accordance with Part IX.
An activity that reduces recharge to an aquifer.	<ol style="list-style-type: none"> 1. A modified activity or a new activity. 2. The activity is or would be wholly or partly located within an IPZ-Q. 3. Despite the local area from which the water is or would be taken having been assessed for the purposes of the latest assessment report to have a risk level of moderate in accordance with Part IX, the local area would be assessed to have a risk level of significant if the modified activity were factored into the risk level assessment. 	The local area from which the water is or would be taken if the area relates to one or more surface water intakes and it was assessed to have a risk level of moderate in accordance with Part IX.	
An activity that reduces recharge to an aquifer.	<ol style="list-style-type: none"> 1. A modified activity or a new activity. 2. The activity is or would be wholly or partly located within a WHPA-Q2. 3. Despite the local area from which the water is or would be taken having been assessed for the purposes of the latest assessment report to have a risk level of moderate in accordance with Part IX, the local area would be assessed to have a risk level of significant if the modified activity were factored into the risk level assessment. 	The local area from which the water is or would be taken if the area relates to one or more wells and it was assessed to have a risk level of moderate in accordance with Part IX.	

Part XI – Drinking Water Threats: Water Quality

Part XI.1 - Describing drinking water issues

114. Without limiting the generality of subclause 15(2)(f) of the Act, the description of drinking water issues shall include the following drinking water issues in respect of the quality of water in a vulnerable area:

- (1) the presence of a parameter in water at a surface water intake or in a well, including a monitoring well related to a drinking water system to which clause 15(2)(e) of the Act applies, if the parameter is listed in Schedule 1, 2 or 3 of the Ontario Drinking Water Quality Standards or Table 4 of the Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines and
 - (a) the parameter is present at a concentration that may result in the deterioration of the quality of the water for use as a source of drinking water; or
 - (b) there is a trend of increasing concentrations of the parameter at the surface water intake, well or monitoring well and a continuation of that trend would result in the deterioration of the quality of the water for use as a source of drinking water;
- (2) the presence of a pathogen in water at a surface water intake or in a well related to a drinking water system to which clause 15(2)(e) of the Act does apply, if a microbial risk assessment undertaken in respect of the pathogen indicates that
 - (a) the pathogen is present at a concentration that may result in the deterioration of the quality of the water for use as a source of drinking water, or
 - (b) there is a trend of increasing concentrations of the pathogen at the surface water intake or well and a continuation of that trend would result in the deterioration of the quality of the water for use as a source of drinking water; and
- (3) the presence of a parameter in water at a surface water intake or in a well, including a monitoring well related to a drinking water system to which clause 15(2)(e) of the Act does not apply, if the parameter is listed in Schedule 2 or 3 of the Ontario Drinking Water Quality Standards or Table 4 of the Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines and
 - (a) the parameter is present at a concentration that may result in the deterioration of the water for use as a source of drinking water, or

(b) there is a trend of increasing concentrations of the parameter at the intake, well or monitoring well and a continuation of that trend would result in the deterioration of the quality of the water for use as a source of drinking water.

115. The description of a drinking water issue identified in accordance with rule 114 shall include the following information:

- (1) the parameter or pathogen concerned;
- (2) the surface water intake, well or monitoring well at which the presence of the parameter or pathogen has occurred;
- (3) the area within the vulnerable area where drinking water threats listed in accordance with rule 118 or 119 may contribute to the parameter or pathogen; and
- (4) the activities, conditions that result from past activities and naturally occurring conditions within the area identified in accordance with subrule (3) that are associated with the parameter or pathogen.

116. If the information required to be included in an assessment report under subrules 115(3) or (4) cannot be readily ascertained, the description of the drinking water issue shall include a plan for ascertaining this information to be included in a subsequent assessment report for the source protection area.

117. If the source protection committee is of the opinion that areas, activities or conditions referred to in subrules 115(3) or (4) are located outside the boundaries of the source protection area, the description of the drinking water issue shall include this information and shall identify the source protection area in which the source protection committee believes such areas and activities or conditions may be located.

Part XI.2 - Listing drinking water threats - Activities

Activities prescribed to be drinking water threats

118. The activities prescribed to be drinking water threats for a vulnerable area in paragraphs 1 through 18 and paragraph 21 of subsection 1.1(1) of O. Reg. 287/07 (General) may be collectively listed in the assessment report as “the activities prescribed to be drinking water threats in paragraphs 1 through 18 and paragraph 21 of subsection 1.1(1) of O. Reg. 287/07 (General)”.

Other activities

119. In addition to activities prescribed to be drinking water threats in paragraphs 1 through 18 and paragraph 21 of subsection 1.1(1) of O. Reg. 287/07 (General), an activity shall be listed as a drinking water threat for a vulnerable area if,

- (1) the activity has been identified by the source protection committee as an activity that may be a drinking water threat;
- (2) in the opinion of the Director,
 - (a) the chemical hazard rating of the activity is greater than 4, or
 - (b) the pathogen hazard rating of the activity is greater than 4; and
- (3) the risk score for an area within the vulnerable area in respect of the activity calculated in accordance with rule 122 is greater than 40.

120. The chemical hazard rating of an activity that is not prescribed to be a drinking water threat under O. Reg. 287/07 (General) shall be a rating that in the opinion of the Director reflects the hazard presented by the chemical parameter associated with the activity, if any, considering the following factors:

- (1) Toxicity of the parameter.
- (2) Environmental fate of the parameter.
- (3) Quantity of the parameter.
- (4) Method of release of the parameter to the natural environment.
- (5) Type of vulnerable area in which the activity is or would be located.

121. The pathogen hazard rating of an activity that is not prescribed to be a drinking water threat under O. Reg. 287/07 (General) shall be a rating that in the opinion of the Director reflects the hazard presented by pathogens associated with the activity, if any, considering the following factors:

- (1) The frequency of the presence of pathogens that may be associated with the activity.
- (2) Method of release of the pathogen to the natural environment.
- (3) Type of vulnerable area in which the activity is or would be located.

122. The risk score of an area within a vulnerable area in respect of an activity that is not listed in the Tables of Drinking Water Threats shall be calculated in accordance with the following formula:

$$A \times B$$

where,

A = the chemical hazard rating or pathogen hazard rating of the activity determined in accordance with rule 120 or 121, as the case may be; and

B = the vulnerability of the score of the area within the vulnerable area determined in accordance with Part VII or Part VIII, as the case may be.

123. If, in accordance with Part VIII, a vulnerability score for the area within a vulnerable area has not been determined, the risk score of that area in respect of an activity shall be deemed to be less than 40.

124. An activity described in rule 119 shall not be listed as a drinking water threat for the purpose of 15(2)(g)(i) of the Act unless the Director is of the opinion that the activity has a chemical hazard rating or a pathogen hazard rating that is greater than 4.

125. If an activity that is not prescribed to be a drinking water threat under O. Reg. 287/07 (General) is listed as an activity that is or would be a drinking water threat, the hazard rating of the activity determined in accordance with rule 120 or 121 or both, as the case may be, shall be listed opposite the activity.

Part XI.3 - Listing drinking water threats - Conditions

Listing Conditions that result from past activities

126. Without limiting the generality of subclause 15(2)(g)(ii) of the Act, the list of conditions that are drinking water threats prepared for the purpose of subclause 15(2)(g)(ii) of the Act shall include each of the following conditions that exist in a vulnerable area and that result from a past activity:

- (1) the presence of a non-aqueous phase liquid in groundwater in a highly vulnerable aquifer, significant groundwater recharge area or wellhead protection area;
- (2) the presence of a single mass of more than 100 litres of one or more dense non-aqueous phase liquids in surface water in a surface water intake protection zone
- (3) the presence of a contaminant in groundwater in a highly vulnerable aquifer, significant groundwater recharge area or a wellhead protection area, if the contaminant is listed in Table 2 of the Soil, Ground Water and Sediment Standards and is present at a concentration that exceeds the potable groundwater standard set out for the contaminant in that Table;

(4) the presence of a contaminant in surface soil in a surface water intake protection zone if, the contaminant is listed in Table 4 of the Soil, Ground Water and Sediment Standards is present at a concentration that exceeds the surface soil standard for industrial/commercial/community property use set out for the contaminant in that Table; and

(5) the presence of a contaminant in sediment, if the contaminant is listed in Table 1 of the Soil, Ground Water and Sediment Standards and is present at a concentration that exceeds the sediment standard set out for the contaminant in that Table.

Part XI.4 - Identifying areas for significant, moderate and low drinking water threats - Activities

Significant drinking water threats

127. An activity listed as a drinking water threat in accordance with rule 115 is or would be a significant drinking water threat in an area set out opposite to the activity in column 3 of Table 1 or Table 2 of the Tables of Drinking Water Threats if the area has a vulnerability score set out in column 4 of the respective Table and all of the circumstances set out in column 2 of the respective Table opposite to the area apply to the activity.

128. An activity listed as a drinking water threat in accordance with rule 118 is or would be a significant drinking water threat in circumstances or areas other than the circumstances or areas, if any, set out opposite to the activity in the Tables of Drinking Water Threats in the circumstances and areas set out in clauses 1 and 2 respectively:

(1) a chemical hazard rating or pathogen hazard rating for a chemical parameter or pathogen associated with the activity determined in accordance with rule 120 or 121 is greater than 4;

(2) the area within a vulnerable area that has a risk score in respect of the activity calculated in accordance with rule 122 that is equal to or greater than 80.

129. An activity listed as a drinking water threat in accordance with rule 119 is or would be a significant drinking water threat in an area within a vulnerable area that has a risk score in respect of the activity calculated in accordance with rule 122 that is equal to or greater than 80.

130. An activity listed as a drinking water threat in accordance with rule 118 or 119 is a significant drinking water threat in an IPZ-3 delineated in accordance with rule 68 at the location where the activity is carried on if modeling demonstrates that a release of a chemical parameter or pathogen from the activity would be transported through

the surface water intake protection zone to the intake and result in the deterioration of the water for use as a source of drinking water for the intake.

131. Despite anything else in these rules, an activity listed as a drinking water threat in accordance with rule 118 or 119 is or would be a significant drinking water threat in the circumstances or areas set out in clauses 1 and 2 respectively:

(1) the activity may contribute to the concentration of a parameter or pathogen identified in a drinking water issue in accordance with rule 114 at a surface water intake or well, including a monitoring well;

(2) the area within a vulnerable area where the activity may contribute to the concentration of the parameter or pathogen identified in the drinking water issue.

Moderate drinking water threats

132. An activity listed as a drinking water threat in accordance with rule 115 is or would be a moderate drinking water threat in an area set out opposite to the activity in column 3 of Table 1 or Table 2 of the Tables of Drinking Water if the area has a vulnerability score set out in column 5 of the respective Table and all of the circumstances set out in column 2 of the respective Table opposite to the area apply to the activity.

133. An activity listed in accordance with rule 118 is or would be a moderate drinking water threat in circumstances or areas other than those circumstances or areas, if any, set out opposite to the activity in the Tables of Drinking Water Threats in the circumstances and areas set out in clauses 1 and 2 respectively:

(1) a chemical hazard rating or pathogen hazard rating for a chemical parameter or pathogen associated with the activity determined in accordance with rule 120 or 121 is greater than 4;

(2) the area within a vulnerable area that has a risk score in respect of the activity calculated in accordance with rule 122 that is equal to or greater than 60 but less than 80.

134. An activity listed as a drinking water threat in accordance with rule 119 is or would be a moderate drinking water threat in an area within a vulnerable area that has a risk score in respect of the activity calculated in accordance with rule 122 equal to or greater than 60 but less than 80.

Low drinking water threats

135. An activity listed as a drinking water threat in accordance with rule 115 is or would be a low drinking water threat in an area set out opposite to the activity in

column 3 of Table 1 or Table 2 of the Tables of Drinking Water if the area has a vulnerability score set out in column 6 of the respective Table and all of the circumstances set out in column 2 of the respective Table opposite to the area apply to the activity.

136. An activity listed as a drinking water threat in accordance with rule 118 is a low drinking water threat in circumstances and areas other than those circumstances or areas set out opposite to the activity in Tables of Drinking Water Threats in the circumstances and areas set out in clauses 1 and 2 respectively:

- (1) a chemical hazard rating or pathogen hazard rating for a chemical parameter or pathogen associated with the activity determined in accordance with rule 120 or 121 is greater than 4;
- (2) the area within a vulnerable area that has a risk score in respect of the activity calculated in accordance with rule 122 that is or would be a significant drinking water threat if the risk score of the area in respect of the activity calculated in accordance with rule 122 is equal to or greater than 40 but less than 60.

137. An activity listed as a drinking water threat in accordance with rule 119 is or would be a low drinking water threat in an area within a vulnerable area that has a risk score in respect of the activity calculated in accordance with rule 122 to be greater than 40 but less than 60.

Part XI.5 - Identifying areas for significant, moderate and low drinking water threats - Conditions

138. The risk score of an area in respect of a condition that results from a past activity shall be calculated in accordance with the following formula:

$$A \times B$$

where,

A = the hazard rating of the condition

B = the vulnerability of the score of the area determined in accordance with Part VII or VIII, as the case may be

139. For the purpose of rule 138, the hazard rating of a condition that results from a past activity is 10.

140. An area within a vulnerable area is an area where a condition that results from a past activity listed in accordance with rule 126 is a significant drinking water threat if the risk score of the area in respect of the condition is equal to or greater than 80.

141. An area within a vulnerable area is an area where a condition that results from a past activity is a significant drinking water threat if the condition located in the area contributes to a drinking water issue described in accordance with rule 114.

Identifying areas for moderate conditions

142. Subject to rule 141, an area within a vulnerable area is an area where a condition that results from a past activity listed in accordance with rule 126 is a moderate drinking water threat if the risk score of the area in respect of the condition is equal to or greater than 60 but less than 80.

Identifying areas for low conditions

143. Subject to rule 141, an area within a vulnerable area is an area where a condition that results from a past activity listed in accordance with rule 126 is a low drinking water threat if the risk score of the area in respect of the condition is greater than 40 but less than 60.

Made by:

Original Signed by Keith West, Assistant Deputy Minister,
Drinking Water Management Division (Acting),
Ministry of the Environment
Director, Section 107 Clean Water Act, 2006

Date made: **December 12, 2008**